

ABSTRACT OF THE DISCLOSURE

A SiO_xN_y gate dielectric and a method for forming a SiO_xN_y gate dielectric by heating a structure comprising a silicon oxide film on a silicon substrate in an atmosphere comprising NH_3 and then exposing the structure to a plasma comprising a nitrogen source are provided. In one aspect, the structure is annealed after it is exposed to a plasma comprising a nitrogen source. In another aspect, a SiO_xN_y gate dielectric is formed in an integrated processing system by heating a structure comprising a silicon oxide film on a silicon substrate in an atmosphere comprising NH_3 in one chamber of the integrated processing system and then exposing the structure to a plasma comprising a nitrogen source in another chamber of the integrated processing system.